



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

Certificate of Approval NMI 13/1/11

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

SICK Model VMS-520 Dimensional Measuring Instrument

submitted by SICK Pty Ltd
5 Helen Street
West Heidelberg VIC 3081

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 129, *Multi-dimensional Measuring Instruments*, dated July 2004.

This approval becomes subject to review on 1/04/22, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 3 approved – interim certificate issued	23/06/06
1	Pattern & variants 1 to 3 approved – certificate issued	2/04/07
2	Variant 4 approved – certificate issued	27/08/07
3	Pattern & variants 1 & 2 amended – variants 5 & 6 approved – certificate issued	18/03/08
4	Variant 7 approved – certificate issued	9/09/08
5	Pattern (Test Procedure) amended – notification of change issued	24/07/09
6	Pattern & variants 1, 2 & 5 amended – variant 8 approved – certificate issued	10/02/10

Document History (cont...)

Rev	Reason/Details	Date
7	Pattern & variants 1 to 8 reviewed & updated – certificate issued	15/08/12
8	Variants 9 & 10 approved – interim certificate issued	31/01/13
9	Variants 9 & 10 amended (validity) – interim certificate issued	13/12/13
10	Variants 9 & 10 approved – certificate issued	17/04/14
11	Variants 11 to 13 provisionally approved – interim certificate issued	7/03/16
12	Variant 11 amended (height) – variant 14 provisionally approved – interim certificate issued	18/03/16
13	Variant 15 approved – interim certificate issued	6/02/17
14	Variants 14 amended (scale interval & encoder) – variants 11 to 14 and 16 approved – Pattern and variants reviewed – certificate issued	29/03/17

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 13/1/11' and only by persons authorised by the submitter.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates No S1/0/A or No S1/0B.

Special

Instruments are only approved for use for determination of the dimensions of opaque objects and for the calculation of volume of the item, for the purposes of determining freight or postal charges.

The dimensions determined may also be used for the calculation (by peripheral equipment) of a volume of the object, also for the purposes of determining freight or postal charges.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.



Dr A Rawlinson

TECHNICAL SCHEDULE No 13/1/11

1. Description of Pattern

approved on 23/06/06

A SICK model VMS-520 dimensional measuring instrument (Figures 1 and 2) which is approved for use for the determination of the linear dimensions of objects while they are in motion. May also be known as a model VMS520 (i.e. without a hyphen).

Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

Instruments are approved for use over a temperature range of 0°C to +40°C and must be so marked.

1.1 Details

The pattern is approved for use for the determination of the linear dimensions of objects having maximum dimensions (i.e. length x width x height) of 200 x 100 x 160 cm and minimum dimensions of 5 x 5 x 5 cm, with a scale interval of measurement (d) of 5 mm, and with a belt speed from 30 to 120 m/min.

The pattern is approved for use in measuring the linear dimensions of opaque objects only; the dimensions determined may also be used for the calculation of volume of the item (refer to the Special Conditions of Approval).

The pattern converts the detected characteristics into the linear dimensions of the smallest rectangular box (parallelepiped – #) that would fully contain the object.

(#) A rectangular box (parallelepiped) is a polyhedron having six faces that are parallel in pairs; each face is a parallelogram and adjacent edges are perpendicular.

1.2 Dimensioning Heads

The pattern includes two SICK model VMD500-0000 laser dimensioning heads (Figures 1 and 2) mounted above a belt-conveyor type load receptor.

Both dimensioning heads take measurements of the object and then the master head calculates the volume. The dimensioning heads operate with SICK version 1.13 software.

Each dimensioning head uses a 3 mW laser diode and a rotating mirror to deflect the light beam across the width of the measurement area. The light reflected by the measurement object is directed to a photoelectric receiver and the phase shift of reflected light is used to determine the width and height of the object.

1.3 CDM-400 Units

Each dimensioning head may be connected to a SICK model CDM (Connection Device Modular) unit to provide additional digital data interfaces and support connectivity and commissioning of the laser dimensioning heads.

1.4 Tachometer

The belt-conveyor type receptor uses an Elcis model 64-1000-1828-B-B-CV-10 tachometer to measure the length of the object in combination with the laser dimensioning heads. The tachometer is fitted with a disc and solid state electronics that produce pulses which measure the displacement of the belt.

1.5 Indications

The pattern is fitted with a local display unit (Figure 3a) and in addition measurement data from the CDM device (when fitted) may be made available by means of an RS232 serial port to other systems for indication and/or printing.

Printed and displayed information must be made available for verification and must comply with the requirements set out in document NMI R 129, *Multi-dimensional Measuring Instruments*, dated July 2004. in particular as per the extract below.

7.9.1 Any printed ticket or displayed indication shall include sufficient information to identify the transaction, for example:

(a) dimensions: length (L), width (W) and height (H);

(b) volume (vol);

[text deleted]

7.9.2 A printed ticket shall also contain the following printed or preprinted information:

(a) that the dimensions and/or volume shown are those of the smallest rectangular box that fully encloses the object;

[text deleted]

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Sealing Provision

Provision is made for sealing the calibration adjustments in the indicator/control panel by preventing access to the setup port ('J4') by means of a cover plate and sealing screws provided by the manufacturer (Figure 3b).

1.8 Descriptive Markings and Notices

(a) Instruments are marked with the following data, together in one location:

Manufacturer's mark, or name written in full	SICK Pty Ltd
Model designation
Serial number of the instrument
Year of manufacture
Pattern approval number	13/1/11
Maximum dimensions for each axis	Max cm
Minimum dimensions for each axis	Min cm
Scale interval	$d =$ cm
Maximum belt speed m/min
Minimum belt speed m/min
Special temperature limits	0°C to +40°C

(b) Instruments carry one or more notices stating REFLECTIVE OR TRANSPARENT ITEMS CANNOT BE MEASURED, or similar wording.

2. Description of Variant 1 **approved on 23/06/06**

With model VMD500-1000 laser dimensioning heads operating with SICK version 1.15 software and using 7.5 mW laser diodes

Note: Any model dimensioning head of the VMD500 series may also be known as a VMD520 series instrument with the same numerical suffix, e.g. the model VMD500-0000 may be known as a model VMD520-0000.

3. Description of Variant 2 **approved on 23/06/06**

With the laser dimensioning heads of the pattern or variant 1 now operating with version 1.20 or version 1.21 software which include additional functions for commissioning and setup, but which do not affect any metrological functions.

Note: Any model dimensioning head of the VMD500 series may also be known as a VMD520 series instrument with the same numerical suffix, e.g. the model VMD500-0000 may be known as a model VMD520-0000.

4. Description of Variant 3 **approved on 23/06/06**

With a SICK model DKV 60-E1Z0-S03 incremental wheel encoder used to measure the displacement of the conveyor belt, instead of the tachometer of the pattern.

5. Description of Variant 4 **approved on 27/08/07**

With the load receptor inclined up to 6° from horizontal.

6. Description of Variant 5 **approved on 18/03/08**

With model VMD500-2000 laser dimensioning heads operating with SICK version 2.** software and using 13.0 mW laser diodes.

This variant may operate with a maximum belt speed of 180 m/min.

Note: Any model dimensioning head of the VMD500 series may also be known as a VMD520 series instrument with the same numerical suffix, e.g. the model VMD500-2000 may be known as a model VMD520-2000.

7. Description of Variant 6 **approved on 18/03/08**

With the display unit shown in Figure 3c which may be used instead of, or in addition to, the display unit shown in Figure 3a.

8. Description of Variant 7 **approved on 9/09/08**

All measured values and associated markings of length now in mm units (rather than cm).

9. Description of Variant 8 **approved on 10/02/10**

The pattern and variants now approved for use for the determination of the linear dimensions of objects having maximum dimensions (i.e. length × width × height) of 260 × 140 × 160 cm.

10. Description of Variant 9

approved on 31/01/13

With a specialised conveyor system having tiltable 'wing trays' (Figure 4) to facilitate sorting of packages.

This system can measure objects having maximum dimensions (i.e. length \times width \times height) of 160 \times 100 \times 100 cm and minimum dimensions of 10 \times 10 \times 10 cm.

This system is similar to the pattern but includes a SICK model VMC800 industrial personal computer which is used to process the measurement data to compensate for the shape of the 'wing tray' conveyor platforms.

A SICK model MSC800 controller is also fitted and is used for calculating and communicating with various components of the system and for merging, indicating and storing information.

11. Description of Variant 10

approved on 31/01/13

With a SICK model DFV 60 incremental wheel encoder used to measure the displacement of the conveyor belt, instead of the tachometer of the pattern or instead of the encoder of variant 3.

12. Description of Variant 11

provisionally approved on 7/03/16

approved on 29/03/17

With the model VMS510-ST12100 which has a single SICK model VMD510-1000 dimensioning head mounted on a linear track above the measuring area to determine the linear dimensions of certain stationary objects.

The variant is approved for use for the determination of the linear dimensions of rectangular box-shaped (parallelepiped (#), cuboidal) objects only having maximum dimensions (i.e. length \times width \times height) of 1100 \times 700 \times 700 mm and minimum dimensions 50 \times 50 \times 50 mm, with a scale interval of measurement (d) of 5 mm.

The variant uses a Sick model DFS60E encoder, and connects to the linear track that the dimensioning head is mounted to. The track moves the dimension head to detect the edges of the stationary object below and processes the measurement data and encoder information to determine the linear dimensions.

13. Description of Variant 12

provisionally approved on 7/03/16

approved on 29/03/17

With the model VMS520-ST2x100 which is similar to variant 11 but uses two SICK model VMD520-2000 dimensioning heads mounted on a linear track above the measuring area to determine the linear dimensions of certain stationary objects including irregular shaped objects.

The pattern is approved for use for the determination of the linear dimensions of objects having maximum dimensions (i.e. length \times width \times height) of 1200 \times 800 \times 880 mm and minimum dimensions 50 \times 50 \times 50 mm, with a scale interval of measurement (d) of 5 mm.

The pattern converts the detected characteristics into the linear dimensions of the smallest rectangular box (parallelepiped – #) that would fully contain the object.

14. Description of Variant 13 **provisionally approved on 7/03/16**
approved on 29/03/17

With the model VMS520-ST3x100 which is similar to variant 12 approved for maximum dimensions (i.e. length × width × height) of 1800 × 800 × 880 mm and minimum dimensions 50 × 50 × 50 mm, with a scale interval of measurement (d) of 5 mm.

15. Description of Variant 14 **provisionally approved on 18/03/16**
approved on 29/03/17

Similar to the pattern but now where the Sick model VMS510 has only a single dimensioning head. May also be known as a model VMS-510 (i.e. with a hyphen).

The variant is approved for use for the determination of the linear dimensions of rectangular box-shaped (parallelepiped (#), cuboidal) objects only having maximum dimensions (i.e. length × width × height) of 2000 × 1000 × 1000 mm and minimum dimensions 50 × 50 × 50 mm, with scale intervals of measurement (d) of either 5 × 5 × 5 mm with a belt speed up to 1.2 m/s, or with scale intervals of measurement (d) of 10 × 10 × 5 mm with a belt speed from 1.2 m/s up to 2 m/s.

This variant uses a Sick model DBS36-E encoder or the tachometer of the pattern or the encoder of variants 3 and 10.

16. Description of Variant 15 **approved on 6/02/17**

With the local display of the Pattern or Variant 6 replaced with a Wilke Technology model TP1000 (Figure 5).

17. Description of Variant 16 **approved on 29/03/17**

With a SICK model DBS36-E encoder used to measure the displacement of the conveyor belt, instead of the tachometer of the pattern or instead of the encoder of variant 3.

TEST PROCEDURE No 13/1/11

Note: Refer to clause **1.5 Indications** – Printed and displayed information must be made available for verification and must comply with the requirements set out in document NMI R 129, *Multi-dimensional Measuring Instruments*, dated July 2004.

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Tests

Instruments shall be tested as follows:

- (a) Test objects shall be used of known lengths such that each axis (i.e. length x width x height) is tested for at least five dimensions between and including the minimum and maximum lengths specified on the instrument nameplate. Each test object shall be rigid and with well-defined edges to simulate the edges of a rectangular box. The lengths shall be known to an uncertainty equal to or better than $\pm 1/5$ of the maximum permissible error, which is equal to the scale interval (d).
- (b) Carry out at least three test runs for each length. Each measurement shall be within the maximum permissible error.
- (c) Check that instruments carry one or more notices stating REFLECTIVE OR TRANSPARENT ITEMS CANNOT BE MEASURED, or similar wording.

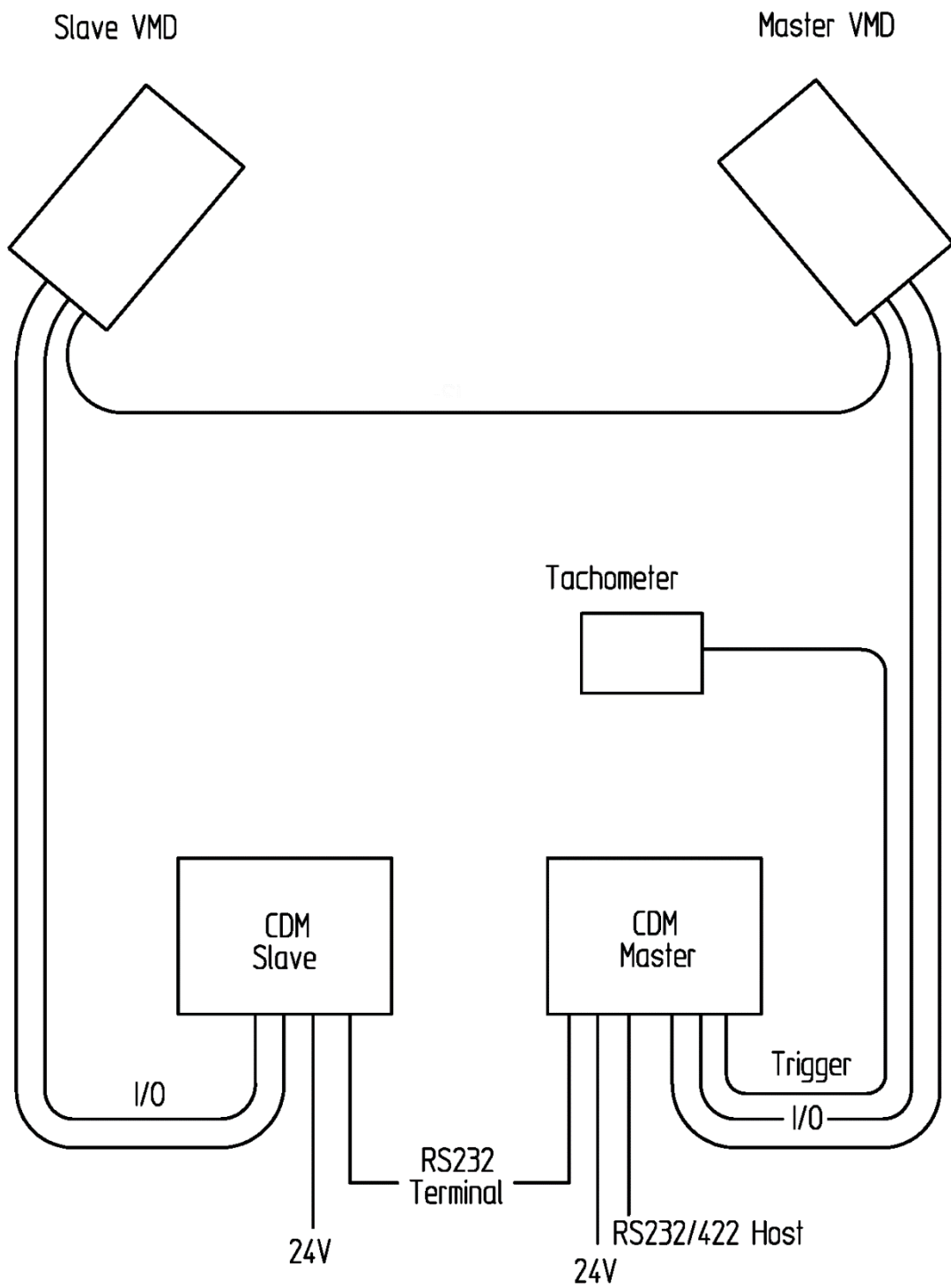
Ensure that instruments are only being used within the special temperature limits stated elsewhere in this Technical Schedule.

FIGURE 13/1/11 – 1



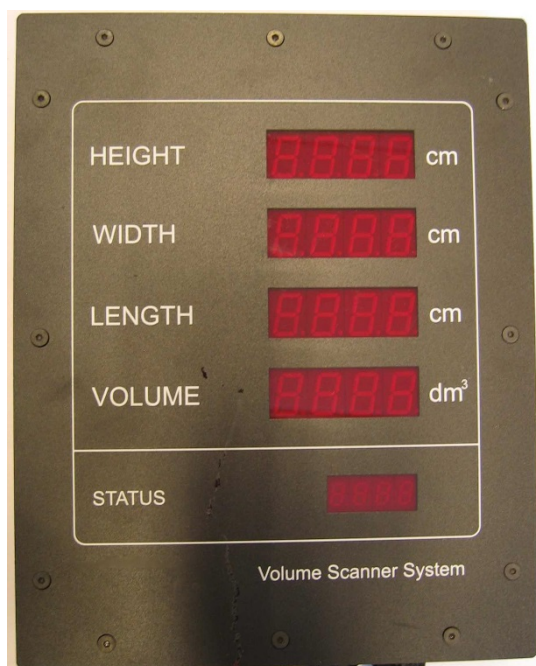
SICK Model VMS-520 Dimensional Measuring Instrument

FIGURE 13/1/11 – 2

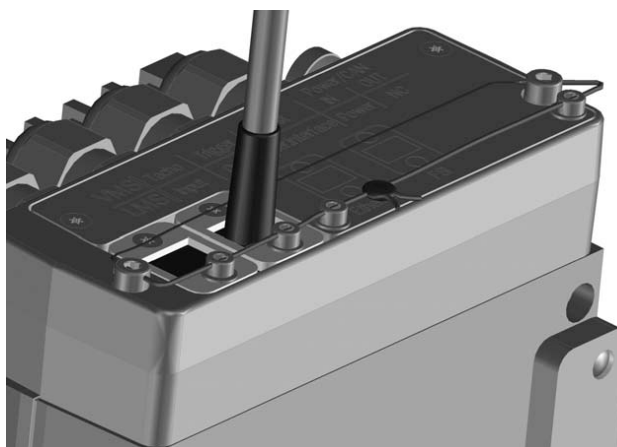


SICK Model VMS-520 Dimensional Measuring Instrument

FIGURE 13/1/11 – 3



(a) SICK Display Unit



(b) Typical Sealing



(c) Alternative Display Unit – Variant 6

FIGURE 13/1/11 – 4

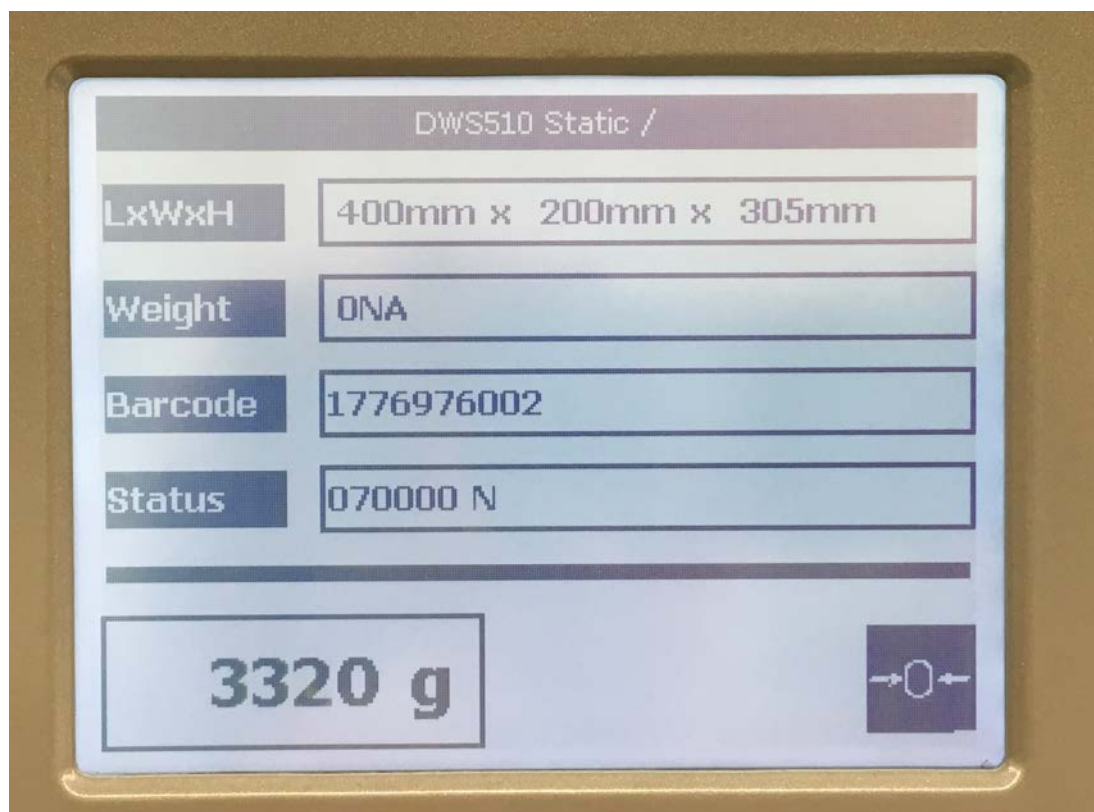


(a) Typical Conveyor System Having Tilttable 'Wing Trays' – Variant 9



(b) Typical Tilttable 'Wing Trays' – Variant 9

FIGURE 13/1/11 – 5



Wilke Technology model TP1000 – Variant 15

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